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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/542,350	04/18/2006	Joel Abadie	05-494	1430

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EXAMINER	
NGUYEN, TINA MY PHUONG	
ART UNIT	**PAPER NUMBER**
3739	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/542,350	ABADIE ET AL.	
	Examiner	Art Unit	
	TINA NGUYEN	3739	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2010 (amendment)*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *17-37* is/are pending in the application.

4a) Of the above claim(s) *28-35* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17-27, 36-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This is a final Office Action in response to amendment filed by applicant on January 13, 2010.

Response to Amendment

2. Claims 17, 18, and 36 have been amended. Claims 17-37 are currently pending in the application, with claims 28-35 withdrawn from consideration. Therefore, claims 17-27 and 36-37 are currently being examined.

3. Applicant's amendments to claims 18 and 36 are sufficient to overcome the previous U.S.C. 112, second paragraph rejection.

4. The following new/ reiterated rejections are set forth:

Claim Rejections - 35 USC § 102

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims **17, 20, 23, 25, 36-37** are rejected under 35 U.S.C. 102(b) as being anticipated by Maruyama et al. (JP2000-135288).

7. As to claim **17,** Maruyama discloses an orientable longitudinal structure (Fig. 1) comprising: an assembly of substantially longitudinal actuators made of shaped memory alloy (15, 16, 17, 18) ; n-doped (PU2) and p-doped (PU1) Peltier elements, and electric control means (53b, paragraph [0026]); said actuators being arranged in pairs (15, 19, Fig. 2) and positioned in parallel in an antagonist way opposite to each other with respect to their respective memorized shape (Fig. 2, Fig. 8a &8c); each said actuator being in contact substantially at its ends with an n-doped Peltier element and a p-doped

Peltier element (Fig. 1), respectively; the assembly being mounted in series with the electric control means to form a thermoelectric circuit so that (Fig. 6), for a fixed direction of an applied current (Fig. 8a), one (15, Fig. 8a) of the actuators of each said pair (15, 18) will heat (shown by the H, marked on Fig. 8, paragraph [0033]) and will undergo a flexion towards its memorized shape (Fig. 8a), and the actuator (18) positioned in the antagonist way will cool (Fig. 8, because the connecting parts (26, 20, 234) between the C side of P1, C side of P2 and 18 are all thermally conductive, paragraph [0020] with "each Peltier device and operation sections 15-18 are connected thermally", cool temperatures at P1 and P2 will also create a slight cooling of 18) and undergo a flexion opposite its memorized shape (where its memorized shape is in an opposite direction in which it is bending, Fig. 8a versus Fig. 8d).

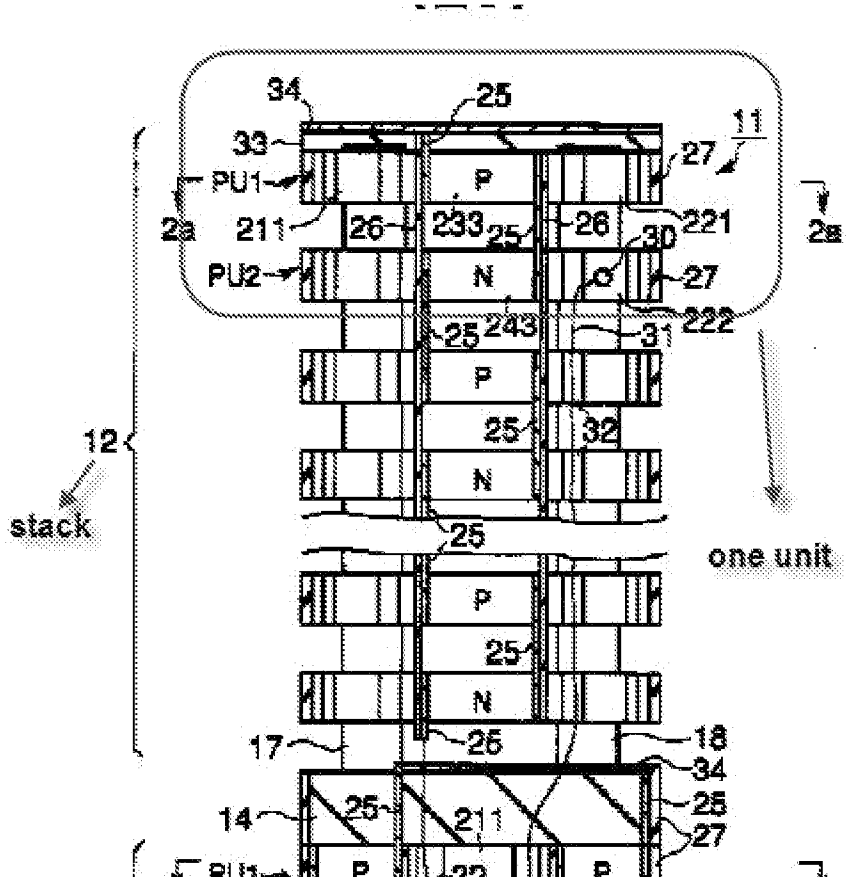
8. As to claim **20**, Maruyama et al. disclose that each n-doped and p-doped Peltier element is in contact with a partially annular conducting element (19, 20, 21, 22, paragraph [0015]).

9. As to claim **23,** Maruyama et al. disclose that the actuators are positioned diametrically opposite each other with respect to the longitudinal axis of the structure (Fig. 2).

10. As to claim **25**, Maruyama et al. disclose that the actuators are made of NiTi alloy (paragraph [0013]).

11. As to claim **36,** Maruyama et al. disclose a stack of orientable longitudinal structures having the claimed limitations as explained in the rejection of claim 17 above (Fig. 1, see Figure below for clarification), each one being identical and electrically

connected to a previous one. The stack has a possibility of orientation about the longitudinal axis of the stack.



12.

13. As to claim **37**, Maruyama et al. disclose that a conducting element (26, Fig. 1, paragraph [0020]) of a structure bearing the n-doped elements is adjacent to a conducting element (25, Fig. 1) bearing the p-doped Peltier elements of the previous longitudinal structures.

Claim Rejections - 35 USC § 103

14. Claim **22** is rejected under 35 U.S.C. 103(a) as being unpatentable over Maruyama et al. (JP2000-135288).

15. Maruyama is silent as the method of attaching the n-doped and p-doped Peltier elements to the conducting elements. However, welding is an art-recognized way of attaching one element to another. Therefore it would have been obvious to one of ordinary skill in the art to weld the n-doped and p-doped pieces to the conducting elements in Maruyama's device and still predictably arrive at the same working actuator.

16. Claims **21 and 26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruyama et al. (JP2000-135288) as applied to claim **17** in view of Abadie et al. (An integrated shape memory alloy micro-actuator controlled by thermoelectric effect).

17. As to claim **21,** Maruyama does not disclose that the conducting element is made of copper. However, Maruyama does disclose that this conducting element should be made of metal of good thermal conductivity (paragraph [0015]). Abadie discloses an analogous shape memory material (1, Figs. 1&3) associated with n-doped (3) and p-doped (2) Peltier elements connected by a copper conducting element (4, Fig.1). It therefore would have been obvious to one of ordinary skill in the art to use copper as Maruyama's conducting element as it is known in the art that copper has good thermal conductivity properties.

18. As to claim **26,** Maruyama does not disclose that the Peltier elements are made of bismuth telluride. Abadie discloses Peltier elements that are made of bismuth telluride, which are connected to shape memory actuators (Col. 1, paragraph 2, page 298). Bismuth telluride therefore is a known material in the art to make Peltier elements out of. It therefore would have been obvious to one of ordinary skill in the art to make

Maruyama's Peltier elements out of bismuth telluride and predictably arrive at the same working invention.

19. Claims **17-22, 24, and 26-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Brotz (U.S. Patent 5,588,295) in view of Abadie et al. (An integrated shape memory alloy micro-actuator controlled by thermoelectric effect).

20. As to claims **17 and 20-21,** Brotz discloses an orientable longitudinal structure (Fig. 1) comprising: an assembly of substantially longitudinal actuators made of shape memory alloy (10, 20, Fig. 1); and electric control means (where there must be an electric control means to supply the current depicted in Figs. 3&4); said actuators being arranged in pairs (Fig. 2) and positioned in parallel in an antagonist way opposite to each other with respect to their respective memorized shape (Figs. 1, 3&4); the assembly being mounted in series with the electric control means to form a thermoelectric circuit so that (Fig. 3 &4, where there has to be an electric control means to supply the current depicted), for a fixed direction of an applied current (Fig. 3), one (10) of the actuators of each said pair will heat and will undergo a flexion towards its memorized shape (Fig. 3), and the actuator (20) positioned in the antagonist way will cool and undergo a flexion opposite its memorized shape (Fig. 3, Col. 3, lines 3-17).

21. Brotz does not disclose that there are n-doped and p-doped Peltier elements with each actuator being in contact substantially at its ends with an n-doped and a p-doped Peltier element. Brotz discloses that the shape memory materials are directly heated up by a current applied directly to the shape memory material (Figs. 3 &4).

22. Abadie teach micro-actuators made of a SMA (1, Figs. 1&3), and indirect SMA heating means: p-doped (2) and n-doped (3) bismuth telluride ingots (one of each side of the SMA), and copper conductors (4). A running of a current through the actuator (Fig. 3) allows the temperature of the SMA blade [to be] controlled in a reversible manner". Abadie teaches that a good control of the strain involves a good control of SMA temperature but temperature control on an SMA is not so easy (Col. 1, paragraph 3, page 297). With Abadie's method of heating, "the phase transition of the SMA blade is controlled and involves control of the deflection theta" (Col. 1, end of page 299, Fig. 1). It therefore would have been obvious to use the SMA heating means (p-doped & n-doped Peltier elements, and copper conducting means) disclosed by Abadie as Brotz means of conveying heat and current to Brotz actuator assembly to have better heating control of the SMA actuators.

23. Per Encarta, "contact" is taken to mean "in a state of communication". Therefore it is considered that in Brotz's modified invention (with the SMA actuator plate inbetween p-doped and n-doped Peltier elements), each actuator is in contact at its ends with an n-doped and p-doped Peltier element.

24. As to claim **18-19,** Brotz discloses that the actuators are one-piece leaves.

25. As to claims **22** and **24**, Abadie is silent as the method of attaching the n-doped and p-doped Peltier elements to the conducting element and to the method of attaching the actuators to the n-doped and p-doped Peltier elemetns. However, welding is an art-recognized way of attaching one element to another. Therefore, it would have been

obvious to use welding as a substitute for the method of attachment in Brotz's modified device and still predictably arrive at the same working actuator.

26. As to claim **26**, Abadie discloses that the Peltier elements are made of bismuth telluride (Col. 1, paragraph 2, page 298).

27. As to claim **27**, Abadie discloses that epoxy resin cover the thermoelectric junctions between the Peltier elements and the actuators (Col. 1, page 303).

Response to Arguments

28. Applicant's arguments with respect to claims 17 and 36 have been considered but are moot in view of the new ground(s) of rejection.

29. While applicants argue that Maruyama does not contain the newly added limitations of amended claims 17 and 36 "the assembly being mounted in series with the electric control means to form a thermoelectric circuit so that, for a fixed direction of an applied current, one of the actuators of each said pair will heat and will undergo a flexion towards its memorized shape, and the actuator positioned in the antagonist way will cool and undergo a flexion opposite its memorized shape", the rejections above in paragraph 7 explain that Maruyama does in fact contain these limitations.

30. Furthermore, these new limitations have been addressed in a separate new rejection using new art.

Conclusion

31. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

32. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

33. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TINA NGUYEN whose telephone number is (571)270-1489. The examiner can normally be reached on M-Thurs 8:30-6:00.

34. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Linda Dvorak can be reached on 571-272-4764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

35. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Linda C Dvorak/
Supervisory Patent Examiner, Art Unit 3739

/T. N./
Examiner, Art Unit 3739
4/7/2010